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# Third order resonance correction using new Trim-S system in J-PARC MR

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In the Japan Proton Accelerator Research Complex (J-PARC) Main Ring (MR), beam loss becomes a crucial issue in achieving the goal of 1.3 MW power since we must keep a sustainable hands-on-maintenance environment. The random third-order resonance of 3νx = 64 and νx + 2νy = 64 is one of the main causes of beam loss. We have successfully used 4 trim coils of sextupole magnets (Trim-S) for correction. However, the off-momentum particles and fourth-order resonance combined with νx = 21 and 3νx = 64 resonance have not been considered. So, an upgrade project of 24 sets of Trim-S is proposed based on the numerical simulation. To verify the effectiveness of 24 Trim-S, we plan to install 4 additional Trim-S for the first step experiment of 8 Trim-S. For this purpose, a new Trim-S control system based on a System-on-Chip (SoC) Field Programmable Gate Array (FPGA) is developed to drive 4 additional power supplies for this experiment. In this paper, we present the experiment configurations, the current results of the beam study, and the plan for the next step.

## Footnotes

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